
A stable mode of bookmarking by TBP recruits RNA polymerase II to mitotic chromosomes.

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Public Summary:

Maintenance of transcription programs is challenged during mitosis when chromatin becomes condensed and transcription is silenced. How do the daughter cells re-establish the original transcription program? Here, we report that the TATA-binding protein (TBP), a key component of the core transcriptional machinery, remains bound globally to active promoters in mouse embryonic stem cells during mitosis. Using live-cell single-molecule imaging, we observed that TBP mitotic binding is highly stable, with an average residence time of minutes, in stark contrast to typical TFs with residence times of seconds. To test the functional effect of mitotic TBP binding, we used a drug-inducible degron system and found that TBP promotes the association of RNA Polymerase II with mitotic chromosomes, and facilitates transcriptional reactivation following mitosis. These results suggest that the core transcriptional machinery promotes efficient transcription maintenance globally.

Scientific Abstract:

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